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Web Survey's Completion Rates: Effects of Forced Responses; Question Display Styles; and Subjects' Attitude

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Abstract

In anticipating a high completion rate for web surveys; researchers must be attentive to the design features; two of which are the forced responses (i.e.; 100%-; 50%; or 0%-forced) and the questionnaire item display (i.e.; paging or scrolling). Moreover; the respondents' favorable attitude towards questionnaires is a key factor driving them to complete the questionnaires. However; no studies have examined the effects of these three variables on web survey completion rates. This research thus attempts to fill this gap. Using a quasi-experiment; we obtained 401 responses to six (i.e.; 3 levels of forced responses x 2 display styles) comparable online questionnaires with identical contents. The analysis confirmed the statistically significant effects of the forced responses; the item display and the subjects' attitudes toward questionnaires on completion rates. In addition to extending theoretical insights into the factors leading to a web survey's completion rates; practical recommendations are suggested based on the findings.

Key words: Web Survey; Completion Rates; Forced Responses; Question Display Styles; Subjects' Attitude

JEL classification: C93; M15

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Introduction

Web-based questionnaires are of great interest among survey researchers (Galesic & Bosnlak; 2009; Reips; et al.; 2007; Liu & Wronski; 2018). One quality indicator of an online questionnaire is whether it can capture a respondent's attention to fill in the questionnaire until its final item. In other words; it is survey completion (Fan & Yan; 2009).

Two important and unique attributes of online questionnaires are the choice of forced responses and display styles of questionnaire items. Neither have been examined in the same project; although each has been inspected in various environments (Derouvray & Couper; 2002; Liu & Wronski; 2018). Moreover; a subject's attitude toward a questionnaire appears to play a certain role in how he or she responds to a survey. That is; only with a favorable perception is a subject willing to complete an entire questionnaire.

Previous work has never examined attitude toward questionnaires in conjunction with the forced responses or display styles of questionnaire items in order to test whether they have significant effect on completion rate in a web survey project. Hence; we aim at testing whether their effects on the completion rate are statistically significant.

Literature Review

Online questionnaires have been adopted by social science researchers as tools to gather data from samples using major web browsers. An increasing number of publications have addressed issues on how to implement a survey using online questionnaires (Reips; 2002; Reips; et al.; 2007).

Compared to offline means; online questionnaires offer three major advantages: (1) the small amount of error in recording the collected data into a file since the data are saved as soon as a response is recorded to a questionnaire item; (2) quick data analysis and data collection processes because of the Internet's worldwide accessibility; and (3) the cost-justified survey on a general topic since researchers can quickly reach a large group of the targeted sample.

However; online survey projects do have two limitations which researchers must address so as to minimize their effect prior to starting data collection. First; an online survey always reaches only Internet users. If the project's target population is those whose profiles are not largely shared with the Internet user; researchers may have to give up on the idea of an online version. Second; given the nature of the Internet; the sample group's responses may differ from when paper-based questionnaires are used. Such responses include those from the same individual or from an unqualified sample group. These could immensely distort the finding's validity and reliability. As a result; researchers may have a set of screening questions to eliminate the respondents who do not meet the survey criteria or check the respondents' IP address for their online responses. If two responses from the same IP address are given within a short time interval; researchers may have to pay close attention to all responses from that IP address (Albaum; et al.; 2010).

One quality check for a survey project is that of the completion rate. It is the number of completed responses divided by the total number of responses. It also indicates the extent to which the subjects are motivated to respond to the entire questionnaire. In using an online survey; it is fairly difficult for a researcher to design the questionnaire so as to retain a respondent's focus so he or she can complete the entire questionnaire (Fan & Yan; 2009). Dillman (2007) remarked that there is no single design solution to gain the subject's attention throughout the answering session. The researcher must be attentive to the holistic design in order to increase the completion rate. Polonsky and Vocino (2010) suggested based on their experiment that old and employed subjects were more likely to complete web-based questionnaires than young or unemployed ones.

Among many attempts have been made to examine the factors affecting an online survey's completion rate; forced response and question display styles are of our interest in this work since no previous attempt has addressed them. Forced responses refers to an online survey execution through which a respondent is reminded to answer a questionnaire item; if he or she had missed it. This feature is impossible in a traditional paper-based survey. With certain programmability; it is easy to detect any missing questionnaire items and remind the individual to answer. The individual can not proceed to the next item unless he or she first

responds to the missing item. The "forced choice" style is similar to the forced response design but they are notably different. The forced choice refers to the survey design that suggests possible choices of answers to which a subject can respond. For instance; a researcher may adopt a four-level scale (e.g.; least; less; more; or most); instead of a typical five-level scale (e.g.; least; less; neutral (or average); more; or most). This is how a researcher forces a subject to agree to certain choices. Yet; the forced response is a design that requires a subject to respond to a questionnaire item; if it is left unanswered. The item could be both a Likert scale or an open-ended question.

Based on the experiment approach; Derouvray and Couper (2002) discovered that the forced-response condition achieved lower performance than did the no-forced condition. Similarly; Stieger et al. (2007) conducted a survey on students' well-being issues in Europe and confirmed that the forced-response increased the number of survey dropouts. In addition; male respondents dropped out faster than female ones. The poor performance empirically supports Dillman's (2007) statement in which the forced-response may be so annoying that the respondent wants to give up or even close the web browser. However; Albaum; et al. (2010) failed to offer empirical evidence as to how forced answering could have lowered completion rate. This effect of the forced responses is still inconclusive. Moreover; not all subjects feel the same; once being forced to respond to survey questionnaires. Western subjects may feel more independent or less obligated to answer the forced-response option in an online survey project than those from the east arising from various perceptions of power distance (Hofstede; et al.; 2010). The suggestion in which survey researchers should not force subjects too much to answer online questionnaires may be valid only for the western subjects. However; no publication has yet verified this statement.

How to display questionnaire items to attract potential respondents' attention and subsequently to retain it until submission of a complete questionnaire has received remarkable attention (Crowford; et al.; 2005; Fan & Yan; 2009; Sedley & Callegaro; 2012). Presenting a too-wide table on a web-based survey led to more dropouts than a simple one (O'Neil; et al.; 2003). Yan and colleagues' (2007) experiment verified that the presence of a progress indicator (i.e.; visual feedback information to tell individuals how far they were into the survey questionnaire) led to fewer dropouts only when the questionnaire length was perceived as being short. Recently; a survey of radiologists validated that the long questionnaire was not a problem as long as incentives were justified (Ziegenfuss; et al.; 2013).

One of the key design guidelines for question display is choosing between scrolling and paging layouts. The scrolling style displays the entire questionnaire on one single webpage. It thus requires a respondent to scroll down while completing it. The paging style displays the questionnaire on many webpages requiring the individual to "flip" to the next page or the next section. The flip could be through a click on next or continue buttons. According to Dillman (2007); the scrolling design demands less computer resources because it requires one single submission of the questionnaire. Moreover; the respondents are able to scroll back to review their responses since it appears solely on one page. However; the paging design allows different structures of the same questionnaire. In other words; the paging design could outperform the scrolling style if the response to each questionnaire item is non-linear (Norman; et al.; 2001). For instance; the subject whose response to the gender item is male would have to answer a different section of the questionnaire; compared to one who replied female. Nevertheless; previous research could not verify if scrolling is better or worse than the paging design (Elliot; et al.; 2002; Peytchev; et al.; 2006). This is perhaps why Elliott; et al. (2002) suggested a hybrid version combining both styles. The hybrid design requires great effort on the researcher's part to balance the number of questionnaire webpages and the amount of up-down scrolling. Das et al. (2009) remarked that the display of one questionnaire item per page could draw upon a subject's attention to the survey; yet; they failed to verify this assertion. In addition; a few projects were unsuccessful in substantiating similar statements (Batageli; et al.; 2002).

Samples often participate in a survey project voluntarily. Incentives have been offered to compensate for their time and effort. Nonetheless; subjects may want to respond to the survey if they have a favorable attitude towards the survey instrument. The online channel is suggested as a platform because it can greatly impress subjects (Albaum; et al; 2010). Based on interviews; anesthetists admitted their attitude regarding survey instruments plays a major role on their willingness to take part in a survey (Smithson & Reddy; 2010).

The review of previous literature indicated two gaps for possible research. First; while a large amount of research has examined response rate; a relatively small portion has investigated completion rate. The response rate could show the percentage of those submitting their survey responses compared to the total number of those who happen to visit the first page of the online questionnaire. Given the context of the web survey; researchers should extend their efforts to cover the completion rate. Second; there is virtually no experiment investigating the effect of the varying degrees of forced responses (e.g.; 100%-; 50%- or 0%-forcing); the different styles of question display (e.g.; scrolling or paging) or the sample's attitude toward questionnaires on a web survey's completion rate. As a result; the current study's objectives were to test if the effects of the forced responses; display styles of questionnaire items and the subject's attitude toward web survey's completion rates are statistically significant.

Research and Methodology

To achieve the study's objectives; this section describes five methodology issues. These are variable operationalization; experimental units; questionnaire content and experimental execution; reliability and validity issues; and data analysis framework and hypothesis statements.

Variable operationalization

Given the study's casual investigative approach; we adopted a quasi-experimental methodology. The three independent variables are (1) forced responses; (2) question display; and (3) a subject's attitude toward questionnaires. The forced-response variable has three possible values. These are: (a) 100%-forced responses (i.e.; subjects are forced to respond to every questionnaire item); (b) 50%-forced response (i.e.; subjects are forced to respond to half of all items) and (c) 0%-forced response (i.e.; subjects are free to leave any questionnaire items unanswered). The selection of the 100% and 0% forced categories was challenged by previous studies (Albaum; et al.; 2010; Dillman; 2007). The 50% choice of forced response was added to see if the forced response should not be dichotomous and researchers may want to force responses only to a few items. The question-display variable has two possible values. They are the (a) scrolling and (b) paging styles of display. Using the scrolling design; the entire questionnaire appears on one webpage. In contrast; the paging style displays a few questionnaire items per page (details on questionnaire development follow in the next section). The subject's attitude towards questionnaires is covariate; and it is measured using four items of the Likert scale adapted from Manfreda; et al. (2002). The only dependent variable is the completion rate measured by dividing the number of questionnaires for which all items are answered by the number of returned questionnaires.

Experimental units

Given the quasi-experimental approach; the participants must not only represent the target population; but also share compatibility to a large degree such that the difference in completion rate; if any; is due to the three independent variables; not to the subjects' incompatibility.

We were fortunate to receive assistance from the Stock2morrow website. This is a portal site in which subscribers and website visitors are able to share knowledge and insight into current investment issues within the Thai context. The website allowed us to invite visitors and their subscribers to participate in our experiment. Based on the 6 conditions (3 levels of forced responses x 2 styles of question display); the number of subjects per condition should at least comprise a sample of 30-40 (Roscoe; 1975). The Stock2morrow website administration agreed to allowing us to post a call for research participation on the website. Within the two-month period of data collection; 401 unique visitors to the website took part in the experiment; of which each condition had a sufficient number of experiment subjects.

Questionnaire content and experiment execution

The six experimental conditions require similar questionnaires of identical content. The differences among these questionnaires must be in the manipulation of the forced responses and the question display. The Stock2morrow website requested that the questionnaire content should help them improve the website and perhaps their business. We therefore included in the questionnaire a total of 36 question items asking

subjects about their demographics; web usage; their lifestyle; and their reaction when asked to participate in an online survey. In addition to these items; we included the four Likert scale questions to measure a subject's attitude toward questionnaires.

Given the three levels of forced responses; those in the 100%-forced-response group were forced to answer all 36 items. We forced those in the 50% group to answer every other item. The subjects in the 0% group were not forced to respond to any items they may have missed. Regarding the question display; the entire questionnaire appeared on one webpage in a scrolling style. For the paging style; the questionnaire was divided into four sections; each of which appeared on one page. The total number of pages for the paging style was thus four pages.

Once the six versions of the experimental questionnaires were crafted; they were pretested on twelve graduate students at Chulalongkorn Business School and a few adjustments made. When all questionnaires were ready; messages were posted inviting visitors to the Stock2morrow website to respond to the questionnaires. We randomized each subject to one of the experiment's six conditions. When the first six subjects had been placed in all six conditions; the next subject was again randomized to one of the six conditions. We repeated the process until the number of subjects in each condition exceeded the minimum threshold of 50 subjects (Babbi; 2014).

Reliability and Validity Issues

We strived to respond to the study's objectives validly and reliably. Such efforts included the following items. First; the questionnaires were carefully crafted and thoroughly tested to ensure their acceptable quality. To minimize the chance of duplicating participation; we developed a session to control the number of responses. We did not keep track of any IP address as suggested in previous online research (Dillman; 2007). Such tracking may have reduced the number of responses from those who might have shared the same computer stations and IP address.

Second; in order to motivate Stock2morrow website visitors to take part in our experiment; we explained in the call for research participation that their participation was essential to the research community. Also; to show our appreciation for their participation; we offered a lucky draw at the end of the project to win an iPad Mini.

Third; to conform with the approach in using an experiment in social science research; we selected the condition of the scrolling style with no forced-response as the control group. This selection was because it is typically a default design available in many online questionnaire services.

Finally; the pretest was deemed useful. It helped us to learn about technical incompatibility and prepare for it. During the pretest; we discovered few flaws in the data we collected. They occurred when pretest subjects used different browsers or worked on diverse platforms to do our questionnaires. To minimize the chance of such differences; we popped up a window suggesting to the subjects a set of acceptable choices.

Data analysis framework and hypothesis statements

Descriptive statistics were used to describe the sample's demographics. The hypothesis was to verify whether the effects of the forced responses; the question display styles and the subject's attitudes toward questionnaires on the online survey's completion rates were statistically significant. We used the analysis of covariance (ANCOVA) technique to test the hypothesis.

Result and Discussion

The demographic profile of the participants in our experiment is presented in Table 1. Most were male; 36-55 years old; with at least a college degree; 25.2% (the largest proportion) of those who took part in the experiment earned a monthly income of 10;000-24;999 Thai baht. Given the call for research participation posted on the Stock2morrow website; 38.2% of the participants who responded to the survey were already subscribers to the website and the rest were only visitors.

Table 1: Profiles of the participants

Gender (n=398)	N (%)
Male	269 (67.6)
Female	129 (32.2)
Age (n=400)	
Less than 23	40 (10.1)
24-35	156 (39.0)
36-55	178 (44.4)
At least 56	26 (6.5)
Highest education (n=398)	
Less than college	26 (6.6)
College level	244 (61.2)
Graduate level	128 (32.2)
Monthly salary (baht) (n=397)	
Less than 10;000	31 (7.8)
10;000-24;999	100 (25.2)
25;000-39;999	86 (21.7)
40;000-54;999	67 (16.9)
55;000-69;999	41 (10.3)
70;000-100;00	28 (7.1)
Higher than 100;00	44 (11.1)
Whether a participant subscribes to the Stock2morrow website (n=398)	
Already a subscriber	152 (38.2)
Not yet a subscriber	246 (61.8)

According to Tables 2 and 3; 47.1% of 401 who had accessed to the experimental questionnaires submitted complete responses. Based on the forced-response levels; the subjects who participated in the 100%-; 50%- and 0%-forced response groups were 85.8%; 39.0% and 18.8%; respectively. It appears from these figures that the more forced responses; the larger the participation. Yet; the subsequent hypothesis testing will confirm if the differences are statistically significant. Given the two styles of question display; 43.1% of those submitting complete responses used the scrolling style whereas 51.6% used the paging style. We also measured the participant's attitude toward the questionnaires. Based on the sample size of 401; attitude scored an average of 4.03; from the one-to-five Likert scales with a 0.56 standard deviation. The absolute values of its skewness and kurtosis statistics are less than one; confirming its normal distribution. This therefore allows us to use the parametric test of ANCOVA. Moreover; its Cronbach's alpha is 0.734. Since it is greater than 0.7; the measurement of the attitude towards the questionnaire appears reliable (Nunnally; 1978).

The outcome of the ANCOVA test is in Table 4. It confirms that the effects of forced response; question display styles and a subject's attitude towards questionnaires on an online survey's completion rates are all statistically significant. However; the interaction effect of the forced responses and the display styles on the completion rate is not significant.

Table 2: Survey responses categorized by three levels of forced responses

	Three levels of forced responses			Total
	100%	50%	0%	
Number of complete questionnaires	115	46	28	189
Number of questionnaires distributed	134	118	149	401
Percentage of complete questionnaires from total distributed questionnaires	85.8	39.0	18.8	47.1

Table 3: Survey responses categorized by two styles of question display

	Two styles of question item display		Total
	Scrolling	Paging	
Number of complete questionnaires	91	98	189
Number of questionnaires distributed	211	190	401
Percentage of complete questionnaire from total distributed questionnaires	43.1	51.6	47.1

Table 4: ANCOVA results

SOV	df	SS	MS	F-Value	Significance level
Forced responses	2	33.55	16.78	104.88	.000
Question display styles	1	1.69	1.69	10.56	.001
Forced responses x Question display styles	2	0.02	0.01	0.06	.932
Attitude towards questionnaires	1	0.97	0.97	6.06	.015
Error	394	64.41	0.16		
Total	400	189.00			

Conclusions

We attempted to test if the effects of the three levels of forced responses; the two styles of question item display and the subjects' attitude toward questionnaires on a web-based survey are statistically significant. While the first two variables are categorical; the final one is treated as a co-variate. Through multiple placements of a call for research participation on the Stock2morrow website; the subjects were randomly asked to respond to one of the six comparable questionnaires with identical content. The majority of the sample were men; aged 24-35 years of age with most holding at least a college degree. These demographic details appear to confirm that our subjects adequately represent Internet users in Thailand (Electronic Transactions Development Agency; 2018).

The differences of completion rates among the subjects who submitted complete questionnaires with varying degrees of forced responses were statistically significant (see Table 2). Based on the findings; the more the subjects were forced to answer; the higher proportion of complete questionnaires they returned. This finding contradicts that of previous work (Albaum; et al.; 2010; Derouvray & Couper; 2002; Swan & Epley; 1981); in which the forced response category was found to be as effective as the non-forced group. In order to offer an explanation as to the contradiction; we speculate two reasons. First; it has to do with the sample's demographic profile. Polonsky and Vocino (2010) discovered that old and employed subjects responded to online questionnaires better than young or unemployed ones. Given that our sample was mostly comprised of those over 30 years old and already with a career; it is thus reasonable that the 100%-forced group had the highest completion rate compared to the other two groups with less degree of forced response. Second; it has to do with cultural difference; especially power distance. Several recommendations on the forced responses often suggest that survey researchers should not enforce the subject too much (Dillman; 2007). Should the sample be enforced too strictly; they might drop out from the survey. However; these recommendations mostly come from experts in the US or Europe (Albaum; et al.; 2010; O'Neil; et al.; 2003; Reips & Voracek; 2007). In fact; the current study may be the first attempt to verify the recommendation using subjects in Asia. Our findings which are contrary to these recommendations could be the result of cultural difference. Hofstede; et al.'s work (2010) on power distance may account for this difference. Subjects in western countries are more independent and less conformist such that enforcement on an online survey could be more annoying than for those in from the East (Wang & Nayir; 2010; Gao; et al.; 2017). When the subjects from Asia; including Thailand; are forced to respond to a questionnaire item; they may feel more obligated to do so; and thereby answer all question items completely. Nonetheless; these two above speculations are highly uncertain and require additional empirical research to validate or disprove.

Regarding the scrolling and the paging styles of the questionnaire item display; the analysis results confirm that paging outperforms scrolling with significant difference (see Table 3). According to Peytchev; et al.'s experiment (2006); the sample in the current study who were randomized to respond to the questionnaire with the paging style appear to have perceived its multiple pages as being short. Because of this; the subjects may subsequently make efforts to provide a more complete answer to the questionnaires than those who responded to the questionnaire with the scrolling style. However; the paging style often takes longer time to progress from one page to the next (Couper & Peterson; 2017). As a result; survey researchers may address the response time in their project; in addition to the completion rate. Hence; empirical work is needed.

Regarding the significant effect of the attitude towards the questionnaire on the completion rate; this is not of great surprise. Once the subjects held favorable perceptions toward the questionnaire (i.e.; the average was 4.03 from the one-to-five range); they could have been largely motivated. This further resulted in the completion of the entire questionnaire.

Our findings offer theoretical and practical contributions. Theoretically; our findings have extended insight into online questionnaire design in the Thai context. Our contribution that may challenge fellow researchers is the empirical evidence in which the Thai survey sample gave complete responses when forced to answer all questionnaire items. While survey scholars in western countries suggest others to be cautious when executing the fully-forced option; our findings do support the idea of full enforcement. This is therefore our unique theoretical contribution that calls for awareness of the cultural differences when researchers execute online survey projects among multiple groups of subjects.

Practically; we have two recommendations for those who intend to use online surveys. First; given the two design features: the forced responses and the questionnaire item display; survey implementers may adopt the 100%-forced-response design and the paging style of item display. Nonetheless; they must keep in mind this option may be efficient only in Thailand or where the power distance is perceived high. Second; the significance of the sample's attitude toward the questionnaire points to the survey execution in which researchers must not underestimate the favorable perception of the sample. For instance; researchers should clearly communicated with the sample group so their attitude toward the questionnaire is constantly positive. Such communication includes a brief friendly introduction of the survey project or the details on how to contact the principal investigators.

Similar to other research projects; the current study has two limitations. First; we adopted the quasi-experiment approach; Although the external validity is acceptable; the internal validity could be inevitably compromised. Second; our conclusion is substantial only among the sample in Thailand. As a result; generalizations across other contexts should be made with high caution.

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